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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/687,180	10/15/2003	Lionell K. Griffith	7171-10910207852	7586
167	7590	08/30/2004	EXAMINER	
FULBRIGHT AND JAWORSKI L L P PATENT DOCKETING 29TH FLOOR 865 SOUTH FIGUEROA STREET LOS ANGELES, CA 900172576			KAO, CHIH CHENG G	
			ART UNIT	PAPER NUMBER
			2882	

DATE MAILED: 08/30/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.		Applicant(s)	
	10/687,180		GRIFFITH, LIONELL K.	
	Examiner		Art Unit	
	Chih-Cheng Glen Kao		2882	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-42 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-6, 15-20 and 29-34 is/are rejected.
- 7) ☒ Claim(s) 7-14, 21-28 and 35-42 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 15 October 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. ____. |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>12/19/03</u> . | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION***Drawings***

1. The drawings are objected to because Center of Rotation is misspelled in Figure 2 as “Cent r of R tati n” and reference number 26 is missing from Figure 9. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as “amended.” If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. The replacement sheet(s) should be labeled “Replacement Sheet” in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

2. The abstract of the disclosure is objected to because the abstract may not exceed 150 words in length. Correction is required. See MPEP § 608.01(b).

Claim Objections

3. Claims 1, 6, 15, 20, 21, and 29-42 are objected to because of the following informalities, which appear to be minor draft errors creating grammatical or lack of antecedent basis problems.

In the following format (location of objection; suggestion for correction), the following suggestions may obviate their respective objections: (claim 1, line 1, “obtaining 3D volumetric imaging”; replacing “imaging” with - -image- -), (claim 6, lines 2-3, “the coordinate”; replacing “the” with - -a- -), (claim 6, line 3, “the shadow”; replacing “the” with - -a- -), (claim 6, line 4, “the image data”; deleting “the”), (claim 15, line 1, “obtaining 3D volumetric imaging”; replacing “imaging” with - -image- -), (claim 20, lines 3-4, “the coordinate”; replacing “the” with - -a- -), (claim 20, line 4, “the shadow”; replacing “the” with - -a- -), (claim 20, line 5, “the image data”; deleting “the”), (claim 21, line 13, “said one or more computer programs”; changing the dependency of claim 21 from claim 15 to claim 20), (claim 29, line 4, “imaging of an object is acquired”; replacing “imaging” with - -image- -), (claim 30, line 1, “The apparatus”; changing the dependency of claim 30 from claim 15 to claim 29), (claim 31, line 1, “The apparatus”; changing the dependency of claim 31 from claim 16 to claim 30), (claim 32, line 1, “The apparatus”; changing the dependency of claim 32 from claim 15 to claim 29), (claim 33, line 1, “The apparatus”; changing the dependency of claim 33 from claim 15 to claim 29), (claim 34, line 1, “The apparatus”; changing the dependency of claim 34 from claim 15 to claim 29), (claim 34, lines 3-4, “the coordinate”; replacing “the” with - -a- -), (claim 34, line 4, “the shadow”; replacing “the” with - -a- -), (claim 34, line 5, “the image data”; deleting “the”), (claim 35, lines 1 and 13, “The apparatus” and “said one or more computer programs”; changing the

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dependency of claim 35 from claim 15 to claim 34), (claim 36, line 1, "The apparatus"; changing the dependency of claim 36 from claim 21 to claim 35), (claim 37, line 1, "The apparatus"; changing the dependency of claim 37 from claim 22 to claim 36), (claim 38, line 1, "The apparatus"; changing the dependency of claim 38 from claim 23 to claim 37), (claim 39, line 1, "The apparatus"; changing the dependency of claim 39 from claim 21 to claim 35), (claim 40, line 1, "The apparatus"; changing the dependency of claim 40 from claim 25 to claim 39), (claim 41, line 1, "The apparatus"; changing the dependency of claim 41 from claim 21 to claim 35), and (claim 42, line 1, "The apparatus"; changing the dependency of claim 42 from claim 27 to claim 41).

For purposes of examination, the claims have been treated as such. Appropriate correction is required.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1-5, 15-19, and 29-33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Oikawa (US Patent 6411674) in view of Griffith (US Patent 5319550).

5. Regarding claims 1, 15, and 29, Oikawa discloses a method, system, and apparatus for digitized tomosynthesis (Title and col. 9, lines 35-45) to obtain images of an object (Fig. 2, M

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and image), in which a ray of energy from a source (Fig. 2, R) travels through the object to impinge on an energy sensor (col. 9, lines 35-45) defining an image plane (Fig. 14, Da) and in which the object is rotated about an axis whereby an image is acquired by the energy sensor at successive rotational positions of the object (Fig. 14, rotation arrow) in which the object is rotated about an axis of rotation at a canted angle with respect to the image plane (Fig. 14, plane of Ma in relationship to Da).

However, Oikawa does not specifically disclose 3D volumetric imaging.

Griffith teaches 3D volumetric imaging (col. 1, lines 28-60).

It would have been obvious, to one having ordinary skill in the art at the time the invention was made, to modify the method, system, and apparatus of Oikawa with the 3D volumetric imaging of Griffith, since one would be motivated to incorporate this for more information about the internal structure of an object (col. 1, lines 28-60) as implied from Griffith.

6. Regarding claims 2, 3, 16, 17, 30, and 31, Oikawa further discloses x-ray radiation (col. 6, lines 8-10).

7. Regarding claims 4, 18, and 32, Oikawa further discloses the sensor as a flat panel digital detector (col. 9, lines 35-45).

8. Regarding claims 5, 19, and 33, Oikawa further discloses the optical axis of the source perpendicular to the image plane (Fig. 4, R and Da).

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9. Claims 6, 20, and 34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Oikawa in view of Griffith as applied to claim 1, 15, and 29 above, and further in view of Ning (US Patent 6477221).

Oikawa as modified above suggests a method, system, and apparatus as recited above.

However, Oikawa does not specifically disclose mathematically tracing a ray of energy through a voxel, computing a coordinate of a shadow of the voxel on the image plane, and extracting and combining image data to form the object space voxel.

Ning teaches mathematically tracing a ray of energy through a voxel, computing a coordinate of a shadow of the voxel on the image plane, and extracting and combining image data to form the object space voxel (col. 5, lines 30-38, 42-47, and 65-67, and col. 6, lines 1-17).

It would have been obvious, to one having ordinary skill in the art at the time the invention was made, to modify the method, system, and apparatus of Oikawa as modified above with the calculated voxel image of Ning, since one would be motivated to incorporate the most efficient algorithm for faster processing of images (col. 5, lines 30-38) as shown by Ning.

Allowable Subject Matter

10. Claims 7-14, 21-28, and 35-42 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter:

Regarding claims 7, 21, and 35, prior art does not disclose or fairly suggest a method, system, or apparatus including determining an axis of rotation of an object and comparing locations of first

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and second shadow images to determine source and object angles relative to an energy sensor, in combination with all the limitations in the claim, all intervening claims, and base claims. Claims 8-14, 22-28, and 36-42 are allowed by virtue of their dependency.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Chih-Cheng Glen Kao whose telephone number is (571) 272-2492. The examiner can normally be reached on M - F (9 am to 5 pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ed Glick can be reached on (571) 272-2490. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



gk



**DAVID V. BRUCE
PRIMARY EXAMINER**